

A CYTOLOGICAL STUDY OF *LANTANA MONTEVIDENSIS* (SPRENG.) BRIQ. IN QUEENSLAND

By R. J. F. HENDERSON

Queensland Herbarium, Brisbane

SUMMARY

Chromosome numbers in *L. montevidensis* are $2n(3x) = 36$ for a sterile exclusively garden form, and $2n(4x) = 48$ for a fertile form that has become widely naturalized.

INTRODUCTION

Lantana montevidensis, commonly called Creeping Lantana, occurs in Queensland in two well marked forms. One, here designated the wild form, fruits freely, has darker purplish flowers, has run out from cultivation and is now naturalized to the extent of being a troublesome weed in a few areas. The other form, here called the garden form, does not ripen fruit and is propagated vegetatively, has slightly paler flowers, and is confined to garden culture.

Previous cytological investigations principally by Paterman (1938), Singh (1951), Tandon & Bali (1955), Sen & Sawhni (1955), Natarjan & Ahiya (1957), Raghavan & Arora (1960) showed the genus *Lantana* to be dibasic with base numbers 11 & 12 and that there are polyploid series based on both these numbers. *L. montevidensis* was reported to have a chromosome complement of 36 by Raghavan & Arora (op. cit.).

MATERIALS AND METHODS

The behaviour of meiotic chromosomes was studied in pollen mother cells (PMC) squashed in 45% acetic acid after staining in alcoholic hydrochloric acid-carminc according to Snow (1963). Mitotic chromosomes were studied in root-tip squashes from vegetative cuttings collected in the field and grown under glasshouse conditions. Excised material was immersed in saturated aqueous para-Dichlorobenzene for three hours prior to fixation and staining as outlined

for PMC. Voucher specimens for counts are held in the Queensland Herbarium. (Wild form—*Henderson* H448 (BRI.077557); Garden form—*Henderson* H449 (BRI.077558)).

Pollen viability was estimated from ten counts of stained grains (excluding stained microspores) in glycerine–lactophenol–aniline blue according to Baylis (1954). Irregularities in the usually smooth walls of some of these stained pollen grains suggest that actual viability is less than that given.

RESULTS

The wild form of *L. montevidensis* is tetraploid with a somatic chromosome number of 48 (figs. 1A and 2A). This appears to be a new number for the species. In the zygotene stage hexavalents, quadrivalents, trivalents, univalents as well as bivalents may be formed. Univalents and multivalent associations occur in most dividing cells. At metaphase I, up to four univalents have been observed not migrating to the plate. At anaphase I, 24 chromosomes may migrate to each pole but a 25–23 separation has been observed. In addition, some cells have been observed where a number of chromosomes remain unrelated to either main group at the poles. Microspore formation after the tetrad stage results from further lagging of these chromosomes.

Chromosome behaviour is more consistent with autotetraploidy than allotetraploidy, while the frequency of univalents and multivalents suggests that reciprocal translocations have occurred following the rise in ploidy level.

Reduced pollen fertility results from these meiotic abnormalities but despite this, the production of fertile seed is high. Pollen viability is approximately 65%, the fertile grains being (26–) 29–35 μ in diameter.

The garden form of *L. montevidensis* is triploid with a somatic chromosome number of 36 (figs. 1B and 2B), which agrees with that reported for Indian plants by Raghavan & Arora (op. cit.). However, contrary to their findings, chromosome behaviour at meiosis is irregular in Queensland plants.

At the zygotene stage, trivalents and univalents as well as bivalents are formed. No quadrivalents were observed. At metaphase I, up to five univalents were observed not migrating to the plate. At anaphase I, 18 chromosomes may move to each pole, but one or two usually lag. By anaphase II, the lagging daughter chromosomes are located well away from the four main groups and consequently lead to the formation of a relatively large number of microspores.

The frequency of trivalent formation suggests the relative similarity of the third set of chromosomes to the supposed diploid complement, but may only indicate accumulated reciprocal translocations in the chromosome complement over a period of cultivation and vegetative reproduction.

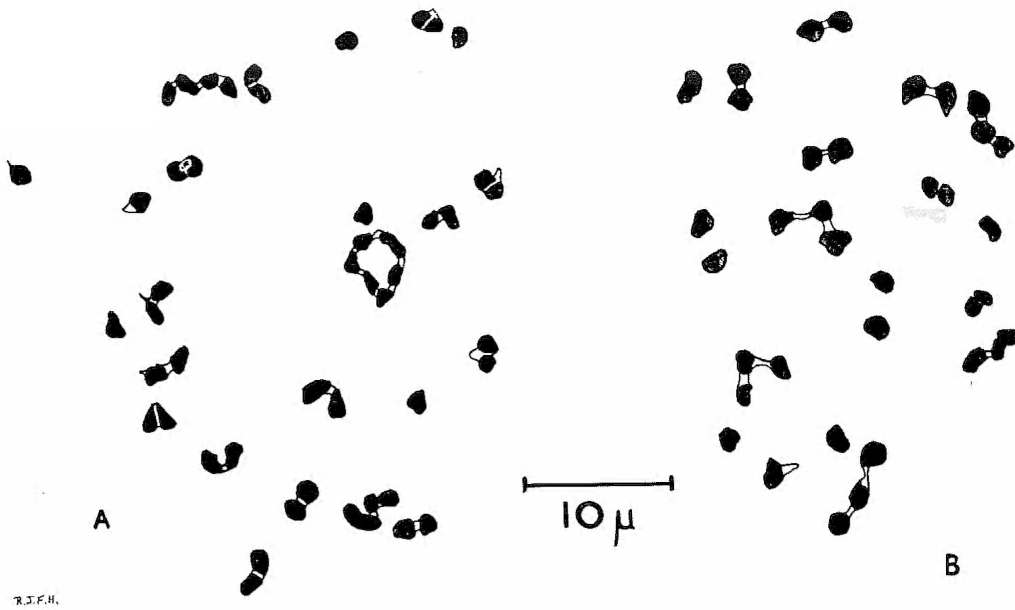


FIG. 1. Meiotic chromosomes at diakinesis in *Lantana montevidensis*. A, wild form (1 VI, 1 IV, 1 III, 14 II, 7 I); B, garden form (5 III, 6 II, 9 I).



FIG. 2. Mitotic chromosomes in root-tip squashes of *Lantana montevidensis*. A, wild form, $2n = 48$; B, garden form, $2n = 36$.

Pollen viability is always less than 6%, the stained grains varying from 22 to 31 μ in diameter. The presence of some viable pollen confirms the statement made by Lewis (1967) that triploids in general have low fertility but contrary to common belief are rarely if ever completely sterile.

With regard to seed production, the plant behaves as might be expected of a normal triploid (as opposed to an apomictic triploid) with no viable seed appearing to be set, although occasionally an ovary will increase in size for a time after flowering.

At magnifications of about 1250 the chromosomes of both forms are quite small. This, unfortunately, does not allow for detailed study of chromosome morphology which may have been useful in postulating relationships between these two forms.

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